

Application No.: 09/854,865

Amendment Date: December 8, 2004

Reply to office action of October 8, 2004

### **Amendments to the Claims**

#### **Listing of Claims**

This listing of the claims will replace all prior versions, and listings, of claims in the application.

#### **CLAIMS**

1 1 (Currently amended) A multi-frame tape library system, comprising:  
2 a plurality of individual library frames connected in series, each said frame comprising a  
3 pulse signal generator, a plurality of tapes, a plurality of tape drive mechanisms for  
4 reading and writing data to said tapes, one or more controllable robot members to  
5 move said tapes to and from said tape drive mechanisms and a delay signal generator,  
6 at least one said frame also comprising a total count counter;  
7 a multi-channel bus coupled to each said frame and comprising a frame bus for carrying  
8 information indicative of the presence of each said frame, and a power bus return bus  
9 carrying information indicative of the last frame in said series;  
10 wherein one of said frames being defined as a first frame and adapted to receive a signal  
11 indicative of power being supplied to any one of said frames and generate a delayed  
12 signal, each subsequent frame receiving said delayed signal and generating a further  
13 delayed signal and each frame generating a pulse on said frame bus; wherein one of  
14 said frames being defined as said last frame and receiving said delayed signal and

15 generating a signal to activate said power return bus; and wherein said total count  
16 counter being incremented by each said pulse on said frame bus until said power  
17 return bus is activated.

1 2 (Original) A multi-frame tape library system as claimed in claim 1, wherein the count in said  
2 total count counter represents the total number of said frames connected together.

1 3 (Previously amended) A multi-frame tape library system as claimed in claim 1, wherein at  
2 least one said frame generates a frame pulse when said delay signal is generated for that  
3 frame.

1 4 (Original) A multi-frame tape library system as claimed in claim 3, wherein at least one said  
2 frame further comprising an individual ID counter being incremented by each said pulse  
3 on said frame bus until said frame pulse is generated.

1 5 (Original) A multi-frame tape library system as claimed in claim 4, wherein the count in said  
2 individual ID counter represents the individual ID of the frame with respect to the total  
3 number of said frames connected together.

1 6 (Original) A multi-frame tape library system as claimed in claim 1, wherein said delayed  
2 signal generated by each said frame having a predetermined delay value that is  
3 approximately constant.

1 7 (Original) A multi-frame tape library system as claimed in claim 1, wherein said delayed  
2 signal generated by each said frame having a delay value that is variable.

1 8 (Currently amended) A modular tape library system comprising:  
2 a plurality of individual library frames connected together in series, at least one frame  
3 comprising a total count counter and an outer door which may be opened when said  
4 at least one frame is under repair;

5 a multi-channel bus for exchanging information and data between said frames indicative  
6 of the presence of each said frame and information indicative of the last frame in said  
7 series;

8 wherein at least of said frames being adapted to receive a signal indicative of power  
9 being supplied to any one of said frames and generate a pulse indicative of its  
10 presence and a delayed signal which is forwarded to the next frame in the series, each  
11 subsequent frame receiving said delayed signal and generating a further delayed  
12 signal and a pulse indicative of their presence; and wherein one of said frames being  
13 defined as said last frame and receiving said delayed signal and generating a signal to  
14 indicate activation of said last frame; and wherein said total count counter being  
15 incremented by each said pulse until signal to indicate activation of said last frame is  
16 detected.

1 9 (Original) A modular system as claimed in claim 8, wherein the count in said total count  
2 counter register represents the total number of said frames connected together.

1 10 (Previously amended) A modular system as claimed in claim 8, wherein at least one said  
2 frame generates a frame pulse when said delay signal is generated for that frame.

1 11 (Original) A modular system as claimed in claim 10, wherein at least one said frame further  
2 comprising an individual ID counter being incremented by each said pulse until said  
3 frame pulse is generated.

1 12 (Original) A modular system as claimed in claim 11, wherein the count in said individual ID  
2 counter represents the individual ID of the frame with respect to the total number of said  
3 frames connected together.

1 13 (Currently amended) A method to automatically detect the total count of frames within a  
2 modular multi-frame tape library system, said method comprising the steps of:  
3 coupling a plurality of frames to a multi-channel data bus comprising a frame bus and a  
4 power bus return bus, each of said plurality of frames comprising a plurality of tapes,  
5 a plurality of tape drive mechanisms for reading and writing data to said tapes and  
6 one or more controllable robot members to move said tapes to and from said tape  
7 drive mechanisms;  
8 designating one of said frames as a first frame;  
9 designating one of said frames as a last frame;  
10 said first frame receiving a signal indicative of power being supplied to any one of said  
11 frames and generating a first delayed signal and a pulse indicative of the presence of  
12 said first frame;  
13 supplying said pulse to said frame bus;  
14 supplying said delayed signal to a subsequent frame, each said subsequent frame  
15 generating a delayed signal and a pulse indicative of the presence of each frame and  
16 supplying the pulses to said frame bus;  
17 generating a signal to activate said power return bus when said delayed signal reaches  
18 said last frame; and  
19 incrementing a register by each pulse until said power bus is activated.

1 14 (Original) A method as claimed in claim 13, further comprising the steps of:  
2 generating a frame pulse when said delay signal is generated for that frame;  
3 incrementing a register by each said pulse on said frame bus until said frame pulse is  
4 generated.

1 15 (Original) A method as claimed in claim 14, wherein the count in said counter represents the  
2 individual ID of the frame with respect to the total number of said frames connected  
3 together.

1 16 (Original) A method as claimed in claim 13, wherein the count in said register represents the  
2 total number of said frames connected together.

1 17 (Currently amended) A multi-frame tape library system, comprising:

2 a plurality of individual library frames connected in series, each said frame comprising a  
3 pulse signal generator, ~~and~~ a delay signal generator, a plurality of tapes, a plurality of  
4 tape drive mechanisms for reading and writing data to said tapes, one or more  
5 controllable robot members to move said tapes to and from said tape drive  
6 mechanisms and at least one said frame also comprising an individual ID counter;  
7 a multi-channel bus coupled to each said frame and comprising a frame bus for carrying  
8 information indicative of the presence of each said frame;  
9 wherein one of said frames being defined as a first frame and adapted to receive a signal  
10 indicative of power being supplied to any one of said frames and generate a delayed  
11 signal, each subsequent frame receiving said delayed signal and generating a further  
12 delayed signal and each frame generating a pulse on said frame bus; wherein at least  
13 one of said frames generating a frame pulse upon generation of that frame's delayed  
14 signal, and wherein said individual ID counter being incremented by each said pulse  
15 on said frame bus until said frame pulse is detected.

1 18 (Original) A multi-frame tape library system as claimed in claim 17, wherein the count in  
2 said individual ID counter represents the individual ID of the frame with respect to the  
3 total number of said frames connected together.

1 19 (Original) A multi-frame tape library system as claimed in claim 17, wherein said multi-  
2 channel bus further comprising a power bus return bus carrying information indicative of  
3 the last frame in said series; and wherein one of said frames being defined as said last  
4 frame and receiving said delayed signal and generating a signal to activate said power  
5 return bus.

1 20 (Original) A multi-frame tape library system as claimed in claim 19, wherein at least one said  
2 frame further comprising a total count counter; and wherein said total count counter being  
3 incremented by each said pulse on said frame bus until said power return bus is activated.

1 21 (Original) A multi-frame tape library system as claimed in claim 20, wherein the count in  
2 said total count counter represents the total number of said frames connected together.

1 22 (Currently amended) A modular tape library system comprising:

2 a plurality of individual library frames connected together in series, each of said  
3 plurality of frames comprising a plurality of tapes, a plurality of tape drive  
4 mechanisms for reading and writing data to said tapes, one or more controllable robot  
5 members to move said tapes to and from said tape drive mechanisms and at least one  
6 frame comprising an individual ID counter;

7 a multi-channel bus for exchanging information and data between said frames indicative  
8 of the presence of each said frame;

9 wherein at least of said frames being adapted to receive a signal indicative of power  
10 being supplied to any one of said frames and generate a pulse indicative of its  
11 presence and a delayed signal which is forwarded to the next frame in the series, each  
12 subsequent frame receiving said delayed signal and generating a further delayed  
13 signal and a pulse indicative of their presence; wherein at least one of said frames

generating a frame pulse upon generation of that frame's delayed signal, and wherein said individual ID counter being incremented by each said pulse on said frame bus until said frame pulse is detected.

23 (Original) A modular system as claimed in claim 22, wherein the count in said individual ID counter represents the individual ID of the frame with respect to the total number of said frames connected together.

24 (Original) A modular system as claimed in claim 22, wherein said multi-channel bus further comprising a power bus return bus carrying information indicative of the last frame in said series; and wherein one of said frames being defined as said last frame and receiving said delayed signal and generating a signal to activate said power return bus.

25 (Original) A modular system as claimed in claim 24, wherein at least one said frame further comprising a total count counter; and wherein said total count counter being incremented by each said pulse on said frame bus until said power return bus is activated.

26 (Original) A modular system as claimed in claim 25, wherein the count in said total count counter represents the total number of said frames connected together.

27 (Currently amended) A method to automatically detect the individual identification of frames within a modular multi-frame tape library system, said method comprising the steps of: coupling a plurality of library frames to a multi-channel data bus comprising a frame bus, each of said plurality of frames comprising a plurality of tapes, a plurality of tape drive mechanisms for reading and writing data to said tapes and one or more controllable robot members to move said tapes to and from said tape drive mechanisms; designating one of said frames as a first frame;

9        said first frame receiving a signal indicative of power being supplied to any one of said  
10        frames and generating a first delayed signal and a pulse indicative of the presence of  
11        said first frame;  
12        supplying said pulse indicative of the presence of said first frame to said frame bus;  
13        supplying said delayed signal to a subsequent frame, each said subsequent frame  
14        generating a delayed signal and a pulse indicative of the presence of each frame and  
15        supplying the pulses to said frame bus;  
16        generating a signal upon generation of said delayed signal; and  
17        incrementing a register by each pulse until said signal is generated.

1    28 (Original) A method as claimed in claim 27, further comprising the steps of:  
2        coupling said plurality of framed to said multi-channel bus further comprising a power  
3        bus return bus;  
4        designating one of said frames as a last frame;  
5        generating a signal to activate said power return bus when said delayed signal reaches  
6        said last frame; and  
7        incrementing a register by each said pulse until activation of said power return bus.

1    29 (Original) A method as claimed in claim 27, wherein the count in said counter represents the  
2        individual ID of the frame with respect to the total number of said frames connected  
3        together.

1    30 (Original) A method as claimed in claim 28, wherein the count in said counter represents the  
2        total number of said frames connected together.

1    31 (Currently amended) A multi-frame tape library system, comprising:



2 a plurality of individual library frames connected in series, each said frame comprising a  
3 pulse signal generator, ~~and~~ a delay signal generator, a plurality of tape drive  
4 mechanisms for reading and writing data to said tapes, one or more controllable robot  
5 members to move said tapes to and from said tape drive mechanisms and at least one  
6 said frame also comprising a total count counter and an individual ID counter;  
7 a multi-channel bus coupled to each said frame and comprising a frame bus for carrying  
8 information indicative of the presence of each said frame, and a power bus return bus  
9 carrying information indicative of the last frame in said series;  
10 wherein one of said frames being defined as a first frame and adapted to receive a signal  
11 indicative of power being supplied to any one of said frames and generate a delayed  
12 signal, each subsequent frame receiving said delayed signal and generating a further  
13 delayed signal and each frame generating a pulse on said frame bus; wherein one of  
14 said frames being defined as said last frame and receiving said delayed signal and  
15 generating a signal to activate said power return bus; and wherein said total count  
16 counter being incremented by each said pulse on said frame bus until said power  
17 return bus is activated; and wherein at least one said frame generating a frame pulse  
18 when said delay signal is generated for that frame, said individual ID counter being  
19 incremented by each said pulse on said frame bus until said frame pulse is generated.

1 32 (Original) A multi-frame tape library system as claimed in claim 31, wherein the count in  
2 said individual ID counter represents the individual ID of the frame with respect to the  
3 total number of said frames connected together.

1 33 (Original) A multi-frame tape library system as claimed in claim 31, wherein the count in  
2 said total count counter represents the total number of said frames connected together.

1 34 (Currently amended) A method to automatically detect the total count and individual  
2 identification of frames within a modular multi-frame tape library system, said method  
3 comprising the steps of:  
4 coupling a plurality of library frames to a multi-channel data bus comprising a frame  
5 bus and a power bus return bus, each of said plurality of frames comprising a  
6 plurality of tapes, a plurality of tape drive mechanisms for reading and writing data to  
7 said tapes and one or more controllable robot members to move said tapes to and  
8 from said tape drive mechanisms;  
9 designating one of said frames as a first frame;  
10 designating one of said frames as a last frame;  
11 said first frame receiving a signal indicative of power being supplied to any one of said  
12 frames and generating a first delayed signal and a pulse indicative of the presence of  
13 said first frame;  
14 supplying said pulse to said frame bus;  
15 supplying said delayed signal to a subsequent frame, each said subsequent frame  
16 generating a delayed signal and a pulse indicative of the presence of each frame and  
17 supplying the pulses to said frame bus;  
18 generating a signal to activate said power return bus when said delayed signal reaches  
19 said last frame;  
20 incrementing a first counter by each pulse until said power bus is activated;  
21 generating a frame pulse when said delay signal is generated for that frame;  
22 incrementing a second counter by each said pulse on said frame bus until said  
23 frame pulse is generated.

1 35 (Original) A method as claimed in claim 34, wherein the count in said second counter  
2 represents the individual ID of the frame with respect to the total number of said frames  
3 connected together.

1 36 (Original) A method as claimed in claim 34, wherein the count in said first counter represents  
2 the total number of said frames connected together.